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Investigating the Effect of Physical Work Environment on Employee Performance: A Study in the Real Estate Sector of Delhi NCR

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Abstract: The purpose of this article is to investigate the effect of the physical work environment on employee performance in the Real estate sector of Delhi NCR. It is the second-highest employment sector after the agriculture sector. Organizations give their attention to increasing employee performance. An important role is played by the work environment. "Work environment" is to be studied as 'Physical work environment' and "Employee performance" as 'Task and Contextual Performance'. This study is based on a quantitative approach. A structured questionnaire was used to collect primary data through survey methods. More than 500 employees of the real estate sector were contacted, and a total of 452 responses were received. After data cleaning, 423 responses were found suitable for the study. Data were analysed by using SPSS and AMOS 22. 'P' values of all four hypotheses are less than 0.05 which shows a positive and significant relationship between the constructs.

Keywords- Physical Work Environment, Employee Performance, Real Estate Sector, Managers, Delhi NCR

Introduction: India's economy is diverse due to its size. The real estate industry is one of the most significant and vital sectors, contributing to the national and international economies, which employs more people than any other industry except agriculture. It has emerged as an employment generator for both the educated and uneducated. It is estimated that the real estate industry will grow rapidly in the coming years" and is "expected to expand to US$ 5.8 trillion by 2047, contributing 15.5 percent to the GDP from an existing share of 7.3 percent" (IBEF Report, 2023).

Customer Relationship Management (CRM), Sales, and Construction are the three major departments that make up real estate companies. Additional support departments for these major departments include Human Resources, Business Development of Land Acquisition, Finance and Accounts, Legal, and General Administration (Elangovan & Rajendran, 2021).

"The term 'real estate' is defined as land, including the air above it and the ground below it, and any buildings or structures on it. It is also referred to as realty. It covers residential housing, commercial

offices, trading spaces such as theatres, hotels and restaurants, retail outlets, industrial buildings such as factories and government buildings. The activities of the real estate sector encompass the housing and construction sectors also" (NITI Aayog; 2015).

In these days, modern organisations operate in a dynamic and ever-changing environment. Workers in different departments or sectors carry out different jobs (Elangovan & Rajendran, 2021). An important role is played by the workplace environment in motivating the employees while performing the job assigned to them because money is an insufficient motivator to encourage the performance required at the workplace in today's competitive and dynamic business environment (Chandrasekar, 2011).

A work environment is an environment where employees may influence to carry out the task assigned to them (Nguyen et al., 2020). It is divided into the physical and the non-physical work environment. "Physical work environment (Joseph, 2016) is a condition or state of the workplace environment in terms of the materials they contain and their effects on workers. Jain & Kaur, (2014) included Air ventilation & temperature, Noise, Infrastructure & Interior and Amenities included in the Physical Environment, which affect the performance of employees. Performance feedback, role congruity, workplace incentives, supervisor support, defined processes, mentoring/ coaching, opportunity to apply, job aids, goal setting, environment factors, physical factors are the most important environmental factors (Chandrasekar K., 2011) that affect employee performance. Bangwal &Tiwari, (2019) includes "workspace and department space" in work environment. Where individual workspace has an exterior view, private conversations, natural light, air, and temperature. On the other hand, Department space is the departmental physical structure that includes layout, more amenities, equipment accessibility, and service to support operation.

Physical environment can influence employees' attitudes and behaviours Zerella et al., (2017). It includes office layout (physical office space & way to arrange the objects) in physical environment as an element. Haynes (2008), two main elements related with physical work environment are the office layout plan and the office comfort. Sugimoto et al., (2020) investigated office comfort in their research, thermal factors, air pollutants, lighting were investigated as factors that affect office comfort. Psychological work environment and Physical work environment were included by Ohrm et al. (2021) in work environment. Supriyanto et al. (2020) revealed that an unbearable environment can lead to inefficient and ineffective employee performance.

In this study, independent variable is work environment and to be studied as Physical work environment. Office layout (Zerella et al., 2017; Haynes, 2008) and office comfort (Sugimoto et al., 2020; Haynes, 2008) to be included in Physical work environment.

Lots of challenges are faced by the organizations in order to compete in numerous sectors of the international market. It is the role of an employee in the organization and his performance which takes the organization to a competitive high. Organizations give their attention towards increasing employee performance (Chahar et al., 2020). Nguyen et al., (2015) state, "Employee performance is essential to the success or failure of the organization".

"Employee performance has been researched in diverse contexts, across different disciplines and cultures over decades with the aim of understanding behaviours, concepts, and resources that promote performance" (Atatsi et al., 2019). Pradhan & Jena (2017) include "Task Performance, Contextual

Performance and Adaptive Performance" in their prescribed framework. Where, Koopmans et al. (2011) proposed four dimensions- "task performance, contextual performance, adaptive performance, and counterproductive work behaviours" in the identified frameworks. Chahar et al., (2020) in their research paper include "Task Performance and Contextual Performance" as dimensions of employee performance. So, in this study employee performance is dependent variable and will be studied as Task Performance (core work responsibilities) and Contextual Performance (more than in the mentioned job description as social & psychological).

Literature Review: Nguyen et al., (2015) investigated that Work environment has a stronger impact on employee performance. Mathews & Khann, (2016) observed four factors that impact on employee productivity physically as well as psychology in workshop environment that are noise, lighting system, furniture and temperature.

Chadburn et al., (2017) described that the importance of people and their space is very essential and the physical and the social/behavioral environment have a significant impact on personal productivity. Pawirosumarto et al., (2017) explored that leadership style, work environment has a positive & significant effect on job satisfaction. Pradhan & Jena, (2017) emphasized that managers and observation behaviour practitioners must use the insights from the factors explored for creating and maintaining a better work environment. Kegel, (2017) shows that the physical work environment influences organizational outcomes, also influence employee outcomes as engagement, performance, satisfaction and well-being.

Berthelsen et al., (2018) examined advance knowledge about the significance of the physical work conditions for the psychosocial work environment within academia. Meulenbroek et al., (2018) recognising scholarly practices in the area of physical office environment and clarifies the "causal relationship between physical office environments and employee outcomes" in the field of CREM/FM. Shobe, (2018) Through literature review, physical work environment & productivity are related in many ways. Productivity can be considered as one's job performance.

Bangwal &Tiwari, (2019) investigated that workplace environment influenced job satisfaction and is important to an employee. Carlisle et al., (2019) found a significant relationship between training effectiveness, work environment. Atatsi et al., (2019) firm/environment -related factors, Job-related factors, Employee related factors were included to find out the relationship between core constructs and employee performance. Job environment & others play crucial roles in determining employee performance.

Budie et al., (2019) found environmental and personal factors both affect satisfaction. Wohlers et al., (2019) state that on the organizational level, trust in management was positively related and on the individual level, routine seeking was negatively related to the appropriate use of the work environment. Zamani & Gum, (2019) find correlation between Activity-based flexible office environment.

Patel & Pillai, (2020) mentioned that employees provide best facility, a good workplace environment which has improved employee performance. Parashakti et al., (2020) found directly and indirectly "positive and significant effect of work environment on employee performance" in the health sector. The assessment indicator for work environment variables namely infrastructure at work,

workplace lighting, workplace cleanliness, workroom air circulation. Nugroho et al., (2020) state work environment & transformational leadership style has a favourable impact on staff performance. Supriyanto et al., (2020) found a significant influence of work environment on employee performance. The work environment directly impacts employee performance.

Amin & Chakraborty, (2021) focused on the impact of 6 physical factors according to the gender of the workers and their work experience in the workplace environment on their performance in the industrial sector. Hanheide et al. (2021) discussed that there is an influence of work environment, employee competencies and organizational culture on employee performance. Misra & Mohanty, (2021) reviewed the various problems of construction companies originating from the labor market & employee performance is being improved effectively through training and leadership development. Sander et al., (2021) briefly summarize the effects of the physical work environment and review existing research on working from home. Shammout, (2021) found "significant and positive relationship between employee performance and work environment" at work in real estate company 'Investo Global'.

Ibrahim & Hassanain (2022) investigate the literature and perspectives of experts on bilateral domains, "facilities management (FM) and real estate management (REM) professionals". Kaluthanthri & Abanpola (2022) investigate the relationship between the social and physical workspace setting on the performances & provides insight to confirm how attributes of top management of knowledge workers in the Information Technology (IT) industry in Sri Lanka.

Ariati et al., (2023) state that Non-Physical Work Environment variables, career development, and Work Motivation have a significant effect on Employee Performance. Aryaa et al., (2023) examine how workplace factors affect productivity at IT firms in Noida. Physical working conditions variable shows the strongest positive and significant relationship with performance.

Hikmah et al., (2023) examine &d proposed a model of the relationship between the physical work environment, work discipline, work motivation and the employees' performance in an organization resulted that Physical work environment affects performance.

Basharat & Alam (2024) mentioned that academic literature gave little focus on the connection between gender, and the physical work environment & made a connection between the masculinist culture. Gracheva & Groen (2024) investigate a range of activities undertaken to align corporate real estate to the needs of real estate and corporate strategy International Real Estate.

Research gap: While reviewing the literature from 2015 to 2024 the authors found very few studies are on work environment in the real estate sector. The literature review studies highlighted the various dimensions of the work environment. However, these studies have gaps, as they do not adequately address whether selected dimensions (office layout and office comfort) of the work environment can also affect employee performance in the real estate sector. Available literature mentioned that there are various sub-departments of the real estate sector such as property management, construction, infrastructure, and customer relationship management. Most of the studies are limited to above mentioned particular departments in the real estate sector. So, in this study, all the above-mentioned departments will be included under the umbrella of Real Estate. The study tries to fill this

gap by "investigating the effect of the physical work environment on employee performance" in the Real estate sector of Delhi NCR.

Objectives & Hypothesis: The objective of the paper is to investigate the effect of the physical work environment on employee performance in the Real estate sector of Delhi NCR. Hypothesis as per the objective are: -

H1- Physical work environment has positive and significant effect on task performance of employees in the Real estate sector of Delhi NCR.

H2- Physical work environment has positive and significant effect on contextual performance of employees in the Real estate sector of Delhi NCR.

Research Methodology:

Measurement: This study is based on a quantitative approach. A structured questionnaire was used to collect primary data through survey method. Constructs were identified based on the literature. The measurement variable was developed after identifying the construct. The item generation of the research instrument was designed through the extant literature review, and a set of items were identified to cover the different dimensions of the constructs. Items & Cronbach Alpha of the Constructs of the instrument were adapted after reviewing the research papers (Table-1).

Willis (2005); Mumtaz, et al., (2017) suggested that a sample size between 5 to 15 individuals is sufficient to pre-test for large-scale surveys. Therefore, 'Five' persons who belonged to the Real estate sector were asked to pre-test the questionnaire and gave their comments on the variable selection & adapted items to measure the construct. Some items were dropped and reworded based on suggestions. So, that the instrument would be understandable to the respondents. The questionnaire comprises demographic characteristics, items related to Office layout and office comfort in Physical work environment and Task Performance, Contextual Performance in employee performance. To test the Face validity, Content validity & Criterion validity, experts from the 'School of Management' of the university were consulted. In order to measure the internal consistency and reliability, Cronbach alpha's value was calculated using SPSS 26 (Table-I). Composite reliability for overall reliability, discriminant and convergent validity was estimated by using AMOS 22. It can be stated that after doing an exhaustive literature review the scales are adapted to the Indian context.

Table-1 : Items & Cronbach Alpha of the Constructs of the instrument adapted

Variables	Extracted/Adapted from	Items	Cronbach's Alpha from adapted paper	Cronbach's Alpha from Testing
1.Physical Work environment				
Office layout	Leah R. wolfild (2010) & Amirazar et. al (2017)	17	0.85	0.89
Office comfort				
2. Employee Performance:				
Task Performance	Chahar et al. (2020)	8	0.88	0.84
Contextual Performance				

Source: Compiled by authors

Data collection: Managers working in real estate companies of Delhi NCR, listed under CREDAI (Confederation of Real Estate Developers' Associations of India) & RERA (Real Estate Regulatory Act 2016) are the respondents of the study. The items in the questionnaire were on Five – Point Likert scale anchored from "1" strongly disagree to "5" strongly agree. Respondents were contacted personally and through LinkedIn and asked to fill out the questionnaire as they felt comfortable (hard copy or Google Forms). The majority of respondents filled out the questionnaire through Google Forms and some respondents were interested in filling manually in hard copy. Adhering to ethical standards the confidentiality of the data was maintained, and respondents were given assurance that the data would be used only for academic purposes. More than 500 employees were contacted, and a total of 452 responses were received. After data cleaning, 423 responses were found suitable for the study.

Data analysis and Results

Sample characteristics: Demographic characteristics (Age, Gender, Marital Status, Type of Organization, Functional Area/ Area of specialization, Educational Qualification, and Total Years of Experience in work-life) of respondents are presented in (Table-II). Most of the respondents are from 30 years of age as indicated by 38.6 percent, followed by the age group 31 to 40 years (38.2 percent), and 41 to 60 years (17 percent). The percentage of male respondents is 80.6 and 19 of female respondents. It indicates that female respondents are less than 50 percent in comparison to male respondents in the presented data. 60 percent of respondents are married. The maximum number of respondents in the presented data (62.8 percent) are working in Private Indian companies. Most of the respondents in the presented data belong to Sales & marketing (41 percent) followed by constructions (13 percent) departments and the rest are specialized as Cost manager, Schedule manager, Quality manager, Contract manager, Project manager of the Real estate sector.

Table-II: Demographic profile of Respondents:					
Categories		Frequency	Percent (%)	Valid Percent	Cumulative Percent
Age Group -	Below 30 Years	163	38.6	38.6	39.1
	31 to 40 Years	161	38.2	38.2	77.3
	41 to 50 Years	72	17.1	17.1	94.3
	51 to 60 Years	25	5.7	5.7	100
	Total	423	100	100	
Gender	Male	340	80.6	80.6	81
	Female	83	19	19	100
	Total	423	100	100	
Marital Status	Single	154	36.5	36.5	38.2
	Married	253	60	60	98.1
	Others	16	1.9	1.9	100
	Total	423	100	100	
Type of Organization	Pvt (India)	265	62.8	62.8	62.8
	Pvt (Multinational)	79	18.7	18.7	81.5
	Govt/Public Sector	23	5.5	5.5	87
	Self-Owned Business	49	11.6	11.6	98.6
	Others	7	1.4	1.4	100
	Total	423	100	100	
Functional Area/ Area of specialization	Production	2	0.5	0.5	0.5
	Finance	33	7.8	7.9	8.3
	Sales & Marketing	173	41	41.2	49.5
	Administration	21	5	5	54.5
	Computer Software	4	0.9	1	55.5
	Personnel HRD	1	0.2	0.2	55.7
	Human Resource	18	4.3	4.3	60
	Constructions	55	13	13.1	73.1
	Cost manager	8	1.9	1.9	75
	Schedule manager	2	0.5	0.5	75.5
	Quality manager	1	0.2	0.2	75.7
	Contract manager	2	0.5	0.5	76.2
	Project manager	32	7.6	7.6	83.8
	Consumer service	16	3.8	3.8	87.6
	others	55	12.8	12.8	100
	Total	423	100	100	

Source: Authors Calculations

As far as educational qualification is concerned 33.4 percent of respondents have a bachelor's degree, 48.6 percent have a post-graduate degree, and 14 .7 percent have a professional degree. The majority of respondents (52.4 percent) have 1 to 10 years of experience and 31.8 percent of respondents have11 to 20 years of experience in the Real estate sector of Delhi NCR.

The measurement model: Office layout and office comfort are the dimensions in the construct Physical work environment; Task Performance and Contextual Performance in employee performance. A total of three constructs is in the measurement model. The conceptual model based on the literature is proposed for the testing shown in figure-1.

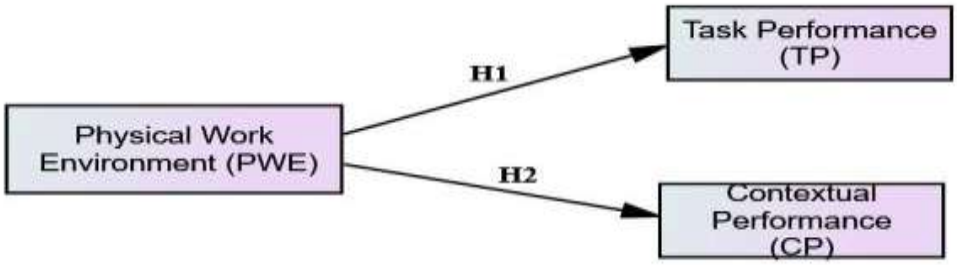

Figure-1: conceptual research model

Source: Prepared by authors

To assess the internal consistency or reliability of the measurement items "Cronbach alpha is the most common measure" (Field. A., 2005; Hazzi & Maldaon, 2015). "Cronbach α Coefficient of 0.70 or higher indicates that the instrument has a high-reliability standard" (Hair, et. al., 2010). Cronbach α for each construct as in Table-1 was above 0.7. Thus, calculated values are suitable for SEM analysis.

'Composite reliability' (CR) is the "more presenting way to overall reliability which determines the consistency of the construct itself" (Hair et al., 2010). Composite reliability (CR) in Table III shows the convergent validity of "TP" is 0.813, "CP" is 0.800, "PWE" is 0.682. CR of construct "PWE" is less than 0.70 still it is near to 0.70. Therefore, all constructs "PWE" as independent variable, "TP & CP" as dependent variable have good internal consistency and reliability in the present measurement model.

EFA/CFA

EFA may be used when little is known about the number of factors and structure of variables. In case of a well-established scale and prior understanding of the factor structure, CFA is more suitable (Green et al., 2016). So, The CFA would be performed to evaluate the "construct validity and reliability" including "convergent and discriminant validity" by using AMOS 22(Figure-2).

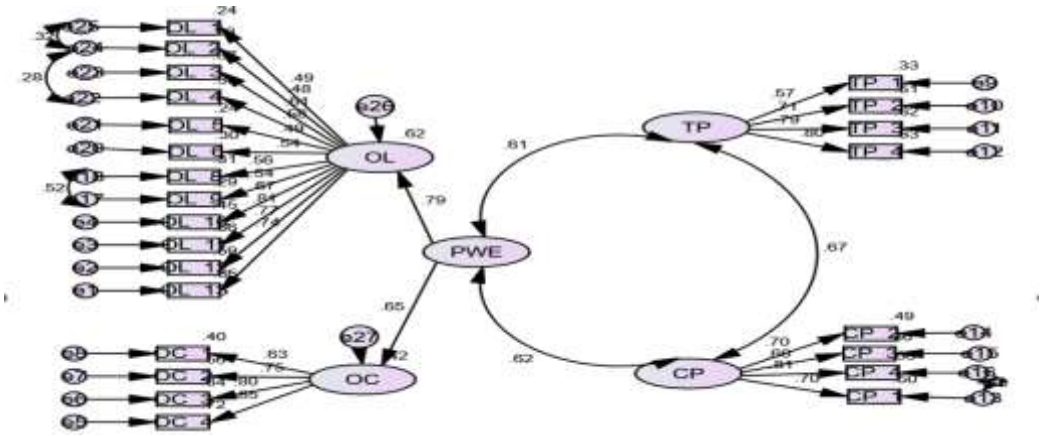

Figure- 2: Structural Model

Source: Prepared by Authors

'Discriminant validity' shows the degree "to which a construct is different from other constructs" (Hair et al., 2010). AVE (Average variance extracted) of the particular constructs is always more than the ASV (Average shared variance) & MSV (Maximum shared variance) between the constructs (Table III). The "square roots of the AVEs are more than the off-diagonal elements" (Table III) in the connected rows and columns that "go above the correlation between a given construct", this demonstrates that a construct has a stronger correlation with its indicators as compared to the other construct. Thus, we can say that our variables have satisfactory discriminant validity.

Table- III: Convergent validity, discriminant validity and composite reliability (CR)

CONSTRUCT	CR	AVE	MSV	ASV	TP	CP	PWE
TP	0.813	0.524	0.449	0.409	0.724		
CP	0.800	0.503	0.449	0.415	0.670	0.709	
PWE	0.682	0.519	0.382	0.376	0.608	0.618	0.721

Source: Authors Calculations

The model fit indices such as $\chi 2/df$, CFI, PNFI, PCFI, RMSEA, IFI, RMR, TLI were chosen to evaluate the model fit and their recommended values are shown in Table- IV, SEM is used to test the full structural final model, aims to evaluate the conceptual model, all values indicated in our model are in the accepted range to examine the hypotheses. Other model fit indices like GFI =0.894, AGFI=0.869, NFI=0.871, RFI=0.854 are near to 0.9. These findings validate the model's validity.

Table-IV: Model fit indices recommended values and values of present model

Model Fit Indices	Values of present model	Recommended values	Authors
CMIN/df	2.4	<3.0	Hair et al, 2009
CFI	0.92	>0.90	Bentler,1990
PNFI	0.77	>0.5	Meyers et al, 2005
PCFI	0.813	>0.5	Meyers et al, 2005
RMSEA	0.058	<0.05	Hu & Bentler,1999
		<.08	Meyers et al, 2005
IFI	0.92	>.90	Meyers et al, 2005
RMR	0.034	<0.05	Hair et al, 2009
TLI	0.909	>.90	Meyers et al, 2005

Source: Compiled by authors

Hypotheses Testing (Structural Model)

To examine the relationship between Physical work environment and Employee performance (Task Performance and Contextual Performance), structural equation modelling (Figure-3) is used in AMOS-22. Following is the representation of the structural model: -

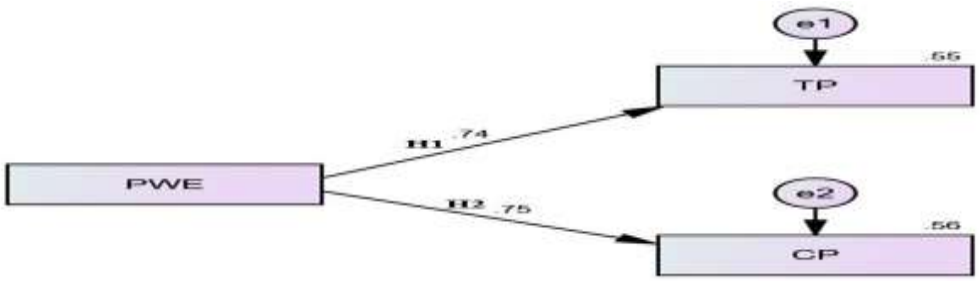

Figure-3: Structural model

Source: Prepared by authors

Table- V indicates the structural model properties as Standard error, critical ratio, standard path coefficient (β), and proposed hypotheses result. 0.05 is set as a level of significance (α). It needs to provide a '*p*' value for any difference, change or relationship called "significant". Hypothesis testing based on path analysis shows that Physical Work Environment is positively and significantly associated with task performance (β=0.74, $P < 0.05$). So, first hypothesis is supported.

Table-V : Summary of testing of hypothesis

Paths			Estimate	S.E.	C.R.	P	Hypothesis test result
TP	<---	PWE	0.74	0.026	22.748	***	Supported
CP	<---	PWE	0.75	0.032	23.135	***	Supported

***Significant
Source: Authors Calculations

Physical Work Environment is positively and significantly associated with contextual performance (β=.75, $P < 0.05$). Hence, second hypothesis is also supported. Based on these results, H1, H2 are accepted because all the '*p'* values are less than 0.05 which show positive and significant relationships between the constructs in the real estate sector. The estimates are found reliable as expected, as relationship between variables (PWE→TP and PWE→CP) is significant ($p<0.05$).

Discussion & conclusion

The results confirmed that the "Physical work environment has positive and significant effect on employee performance". In the Physical work environment, dimensions like adequate spaces, good location, interaction with many people, least distractions and interruptions, informal and social interactions, sense of pride, fun and exciting place, creativity and innovation, coworkers support were included to show that these factors have an impact on employee performance.

In this study task performance includes core work responsibility, potential of the employee, fulfilling the tasks set out in the job description, improvement in core job performance. Which effected by physical work environment. H1 states that Physical work environment has "positive and significant effect" on task performance of employees in the Real estate sector of Delhi NCR. The calculated *'P' value* is less than 0.5 which means that first hypothesis (H1) is supported & physical work environment have strong positive and significant effect on task performance (β=0.74, $P < 0.05$). It can be stated that Good physical work environment helps to improve the task performance.

Where, Contextual performance includes more than in the mentioned in job description or not a part of formal job description as strengthen social network, contribution towards achieving team performance, help to colleagues having heavy workload. H2 states that Physical work environment has "positive and significant effect" on contextual performance of employees in the Real estate sector of Delhi NCR. The *'P' value* is less than 0.5 which means that second hypothesis (H2) is supported & physical work environment have strong positive and significant effect on contextual performance (β=.75, $P < 0.05$). It can be stated that Good physical work environment also helps to improve the

contextual performance. Both hypotheses are accepted as mentioned in the results of the hypotheses testing section (Table-V).

Findings of the study corroborate to the other studies (Parashakti et al.,2020; Supriyanto et al., 2020; Usman, 2021; Shammout, 2021; Hanheide et al. 2021; Kaluthanthri & Abanpola, 2022; Aryaa et al., 2023; Hikmah et al., 2023) in various sectors that physical work environment has a positive and significant effect on employee performance.

It can be concluded that factors including in Physical work environment positively affect the task and contextual performance of employees in the Real estate sector of Delhi NCR.

Managerial Implication

Modern organizations are working in a changing and dynamic environment. This study reveals that employees are concerned about their work environment. The majority of respondents believe that "Better the work environment better the employee performance". Real estate sector organizations must identify what can improve the performance of managers working in the sector. Designing a well-structured work environment may be a technique for improving employee performance. A healthy & supportive work environment can connect with the interests of employees and accomplish the goals of an organization. Competent employees of any organization, working in a positive environment act as sincere employees and work well with full dedication & commitment. They can develop healthy, helpful, humane & representative attitudes towards the customers, society & organization itself. So that they feel highly motivated to perform well at their workplace.

This study will lay as a guide to the companies to improve the fresh air, natural daylight, sufficient workspace and privacy and other factors mentioned in the discussion and conclusion section which help to enhance the employee performance. Managers should keep these things in mind when creating their plan and worker management policies. Organizations, researchers and practitioners need to incorporate workplace design that fosters innovation, creative thinking, and connection to nature.

The findings of this paper may be used as a guide for recognizing the factors of work environment in the Indian real estate sector. So, Real estate companies should make efforts to promote the features of work environment for enhanced employee performance.

Limitations & Scope for Future Work

Although the study's objectives were met and the research hypotheses were supported by evidence, several unavoidable limitations existed. Lower & middle-level managers working in the Real estate sector were the respondents. In the future, the study can be done on top-level managers. This research was conducted only in the real estate sector of Delhi NCR in India hence only the employees belonging to the real estate sector were included in this study. Therefore, to generalize the result, other industry sectors and regions can be involved differently in the future research, future researchers can expand their research scope geographically or to other sectors like IT, the Hotel Industry, the Manufacturing Industry, etc or globally.

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